

ABSTRACT OF THE DISCLOSURE

An adaptive image tone mapping curve based on perceptual preference guidelines is generated as a sigmoidal function, in which the sigmoidal function parameters (slope and shift) are determined by original image statistics. Tone curves generated for different images each have a smooth sigmoidal shape, so that the tone mapping process does not change the image histogram shape drastically. The sigmoidal function has the form:

$$t(x) = \frac{100}{1 + \exp(-\alpha(x/100 - \beta))} ,$$

where α is the slope parameter and β is the shift parameter. The input value x in the sigmoidal function varies in the range $[0, 100]$, because the tone curve is generated on an L^* scale, which has values from 0 to 100. The sigmoidal tone curve calculation can be implemented efficiently using simple arithmetic operations by pre-calculating and storing various factors used in the calculation of α and β and by pre-generating a pair of fixed tone curves with two extreme slopes and interpolating between the curves.